

Staff Memorandum



To	Mayor A. Nuttall, Deputy Mayor R. Thomson and Members of Council
Subject	Battery Electric Bus (BEB) Pilot and Testing
Date	May 13, 2026
Ward	All
From	B. Forsyth, Director of Transit and Parking Strategy
Executive Member Approval	R. James-Reid, General Manager of Access Barrie
CAO Approval	M. Prowse, Chief Administrative Officer

The purpose of this memorandum is to provide members of Council with an update concerning the pilot of two (2) Battery Electric Bus (BEB). During this pilot program staff will be gathering metrics and KPI's for a 12-month period and provide regular updates to Council. Currently that pilot period is set to in summer of 2026. This memo is for the testing completed thus up to February 2026.

Staff have collaborated with the City's transit service provider to complete the winter phase of testing the BEB's. Performance data are summarized as follows:

	December	January	February
Mileage (km/kWh)	0.66	0.55	0.61
Regenerative Braking Ratio*	0.25	0.22	0.27
Estimate Range (km)	196	163	182
Electric Heat Energy Use (kWh)	40	52	59
* Regenerative Braking Ratio = Regenerative Energy /BEB Energy Consumption			

Table 1. BEB - Winter operational performance

	Fall	Winter
Mileage (km/kWh)	0.96	0.60
Regenerative Braking Ratio*	0.37	0.25
Estimate Range (km)	285	179
Electric Heat Energy Use (kWh)	9.15	50.17

Table 2. BEB – Fall versus Winter Operational Performance

Staff observed a significant decrease in vehicle range, averaging 179 kilometres for the winter months. This decrease can be attributed to a few different factors:

- Decrease in regenerative braking ratios
- Dropping Ambient Temperatures
- Significant increase in cabin heating usage

The decreasing regenerative ratios could be attributed to the icy winter road conditions, which limits the efficiency of regenerative braking energy recovery. Furthermore, with the lower average

temperatures during the winter testing period (-10°C), compared to 12°C in the Fall. The BEB required more energy to maintain cabin temperatures, and in turn reduces the BEB range.

Staff also compared the fuel and energy dollar cost per kilometre of a conventional 40' diesel bus versus the 40' BEB's. Overall, the average costs inclusive of summer, fall and winter for diesel buses cost \$0.43/km while BEB's cost \$0.41/km

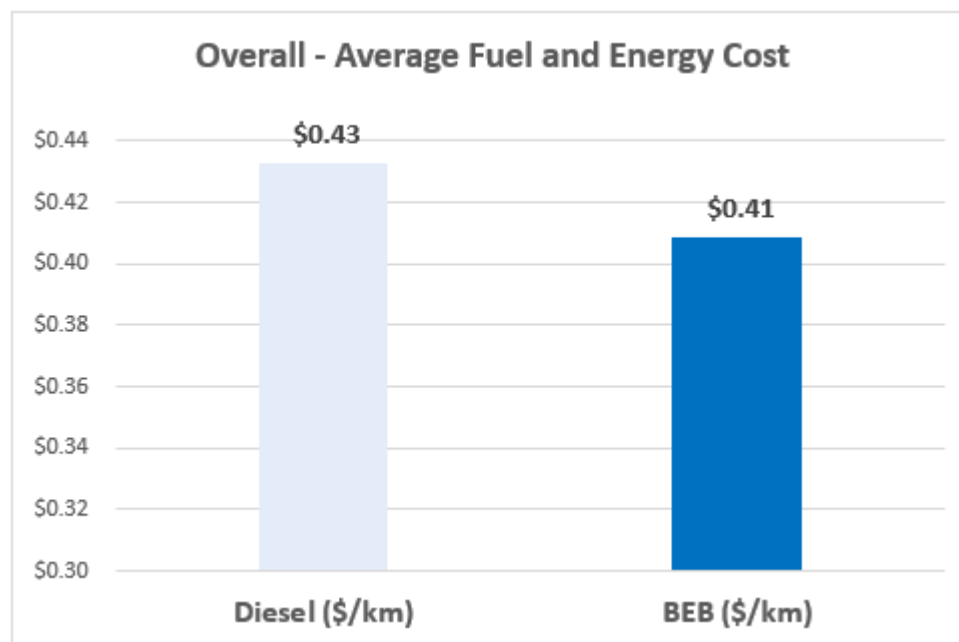


Figure 1. Overall Average Fuel and Energy Cost

It is important to note that the narrowing cost gap between Diesel and BEB considers the modest increase in diesel fuel's costs (\$0.48 per kilometre) in the winter, but the BEB's incur higher overall cost of about \$0.68 per kilometre. This is largely due to the significant energy demand for cabin heating, resulting in a net reduction in energy available for vehicle propulsion, driving up the costs per kilometre. Staff hypothesize that there are ways to reduce the BEB energy costs by adjusting the setting and usage of the auxiliary diesel heat pump on the BEB's.

The City's transit service provider has provided generally positive feedback as it relates to operating the BEB's. Operators note the quiet, smooth rides, and are more comfortable to operate. Though there were some concerns from Operators about battery life and experiencing range anxiety, specifically when the heating system is in use.

Staff also recognize that the winter events the City experienced were abnormal and does not represent the typical winter conditions. Staff are of the opinion that additional testing and data collection, especially in winter conditions, would improve the overall data collection and better represent the BEB's operational trends and costs.

Memo Author:

Evan Chen, Manager of Transit Fleet, Barrie Transit

File #:

Pending #: Not Applicable